LETTERS TO THE EDITOR.

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The "Earthquake House" at Comrie.

I RECENTLY visited the "Earthquake House" at Comrie, and was sorry to find that, in the matter of repairs, it had been neglected for a long time, and was in a very dilapidated condition.

It may be remembered that this small building was erected in 1872, through the combined efforts of the British Association and Mr. Drummond, for the purpose of carrying on observations on the, then, frequent manifestations of seismic activity experienced in that district, and I believe the investigations made there, with the simple apparatus and methods employed, represent some of the earlier attempts to obtain definite data respecting the direction, duration, and intensity of seismic vibrations. From these and other early observations, I suppose, the modern science of experimental seismology has been evolved, and for this reason the building should always be regarded as of great scientific and historical interest, and its preservation a matter of common desire. Though the original wooden pins which were used have disappeared, some of the white sand that was placed on the floor some forty years ago is still to be seen there.

Mr. J. J. Macdonald, of the Commercial Bank, Comrie, has most kindly associated himself with me in an endeavour to obtain permission to place this property in the hands of a committee, and to raise funds for the purpose of protecting it and putting it in a proper state of repair. We propose to fence it in so that it may be preserved from the depredations of children and others (who now have free access to it) for all time.

Without now entering into the details of the trouble and correspondence our negotiations have entailed, I may say that the owner has kindly given us full permission to take such steps as may be necessary for the restoration and protection of the building, and that we hope to place it, as far as possible, in its original condition without delay.

An estimate has been submitted to us, and the sum required to carry out all the necessary work is about 30*l*.

May I ask those of your readers who are interested in this matter to subscribe towards this sum? Mr. Macdonald has kindly consented to act as treasurer, and all donations should be sent to him without delay. The names of those forming the committee, a list of subscribers, and the details of the work done, will be published later.

CECIL CARUS-WILSON.

Preston Vicarage, Faversham, September 11.

The Upper Trade-winds.

RECENTLY Herr Peppler[1] directed attention to the fact that the air-pressure gradient from the equator towards the subtropical zones, which is positive at the heights at which the anti-trade-winds blow, must be negative in still higher layers (±20 km.).

Owing to the low temperature of the stratosphere above the equator, the mean temperature of the whole air-column up to these heights is lower above the equator than above the subtropical zones, and Herr Peppler accordingly supposes that the air pressure at the top of the column is also lower.

Consequently, we may expect to meet above the anti-trade a wind blowing towards the equator, and it would be reasonable to call this wind the *upper trade-wind (Oberpassat; Vent alizé supérieur)*. The ascents of registering and pilot balloons made during the last two years at Batavia Observatory have given some proof of the existence of this upper trade-wind.

Regarding the air-pressure gradient, I compared the pressures recorded during the balloon ascents made on the *Otario* cruises in the North Atlantic, in ±30° N. latitude, with those found at Batavia in the corresponding southerly season. These mean pressures and differences follow hereunder:—

Height		Air Pressure Batavia 6° S		N. Atlantic ±30° N.		Difference
km.		mm.		mm.		mm.
12	...	164	...	157	...	7
13	...	139	...	136	...	3
14	...	119	...	117	...	2
15	...	100	...	99	...	1
16	...	86	...	85	...	1
17	...	74	...	74	...	0
18	...	63	...	65	...	−2

Though the records are few in number, the decrease and reversal of the gradient are conspicuous.

The numerous balloon-flight observations now made in Batavia (the results of which are just going to the press) have proved that the anti-trade reaches a maximum at a height of 12–15 km. (in the dry season lowest and in the rainy season highest). Higher up its strength decreases, and at heights of ±17 km. feeble southerly and westerly winds blow. Berson was the first to observe these winds in Central Africa.

The height at which I found them above Batavia, viz. ±17 km., corresponds exactly with that in which the pressure gradient passes the zero value.

Still higher up we must expect to meet the upper trade, and the explanation of the occurrence of these southerly and westerly winds simply is that they are feeble winds of variable direction occurring between two great overlying air currents, similar to those which are often observed in the layers between trade and anti-trade, or monsoon and trade.

Recently the ascent of a balloon of 2 kg.,[1] which reached 22 km., gave fair evidence of the existence of the upper trade, as may be seen from the wind directions and velocities given hereunder:—

	Height	Wind blowing from	Velocity in m. p. sec.		Height	Wind blowing from	Velocity in m. p. sec.
	km.				km.		
Anti-Trade	13	E 15 N	12·8	Upper Trade	17·5	E 85 S	4·6
	13·5	E 22 N	15·2		18	E 25 S	8·8
	14	E 32 N	15·2		18·5	E 7 S	13·6
	14·5	E 35 N	20·8		19	E 9 S	15·0
	15	E 34 N	21·2		19·5	E 4 S	21·1
	15·5	E 23 N	28·8		20	E 11 N	28·5
	16	E 4 N	24·0		20·5	E 3 S	27·2
	16·5	E 16 N	26·9		21	E	27·2
	17	E 15 N	7·5		21·5	E 9 S	30·4
					22	E 10 S	30·8

The present dry season is not advantageous for the discrimination of the upper trade from the upper easterly counter-wind, because, according to the difference observed between the dry and wet season, in this season pressure at those heights is lowest probably over Java and not over the equator. Consequently, the southerly components by which the upper trade differs from this counter-wind will be small.

In the rainy season (December-February), however, the contrary will be the case, and accordingly I expect to obtain in those months observations which will give stronger evidence of the existence of the upper trade-winds.

W. VAN BEMMELEN.

Batavia Observatory, August 20.

Rainfall in the Summer of 1911.

ONE does not hear much of effort on the part of official meteorologists to supply long-range forecasts of months, seasons, &c. It may be said, the thing cannot be done; better to say, it cannot be done infallibly. My own experience leads me to think a beginning might now be made with what will no doubt some day be a familiar institution, like the useful but imperfect daily forecast.

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[1] Beiträge zur Physik der freien Atmosphäre. Bd. iv., Heft 1.

[1] This balloon reached as a registering balloon a height of 15·5 km. on July 18; at that height it burst, was found again and brought back, and after being carefully pasted, it was sent up again on August 3 as a pilot balloon, being observed from two points 1·9 km. apart.

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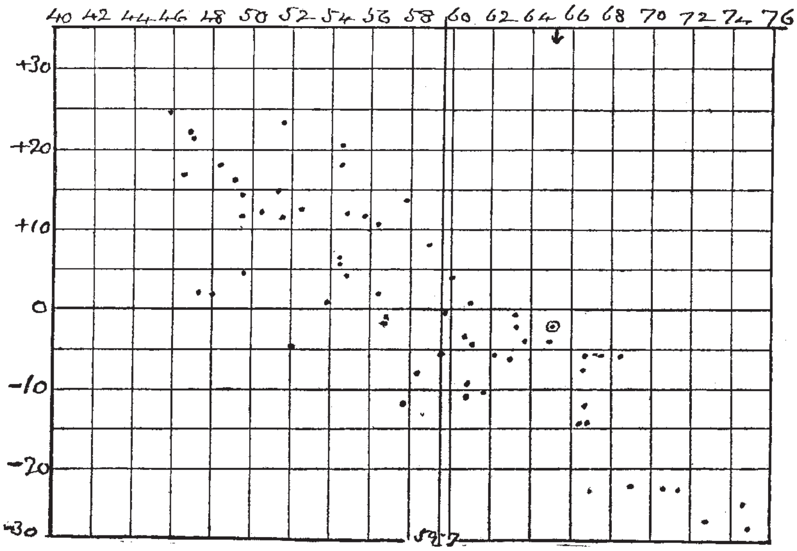
The question may be asked, Could the remarkable qualities of this summer (so hot and dry) be foreseen in any measure? I consider there was reason to expect a very small rainfall (at Greenwich); and I would submit the enclosed rough dot diagram in support of this view.



Rainfall comparison of Greenwich summer.

It is got thus: the rainfall of spring plus summer (March–August) in each year, 1841–1910, is noted, and these values are added in groups of five (1841–5, 1842–6, &c.). Then each sum is compared, by the dot method, with the difference between it and the *fifth* after, a plus value meaning that the later sum is the higher, while a minus value means it is lower. (Each dot signifies one sum by the horizontal scale, and the difference by the vertical.)

Before this summer we had got to comparing the sum for 1903 (*i.e.* the group 1901 to 1905), which is 68·4 inches, with the difference between it and the sum for 1908 (*i.e.* 1906–10), which is 6 inches (68·4–62·4). Next we have the sum for 1904, which is 65·3 inches, and the value for 1909 has to be ascertained (*i.e.* the group 1907–11).

Find 65·3 in the horizontal scale (see arrowhead), and consider where the new dot is likely to go. (The encircled dot shows its actual position.) It will be seen that, wherever the sums have exceeded (say) 62 inches, the fifth sum after has been a lower value hitherto. Let us lessen the sum 65·3 by 1 inch, and see what we get. We have thus 64·3 inches as (say) an extreme upper limit for the group 1907–11. Now, the sum for 1907–10 was known, viz. 54·5; and 64·3 − 54·5 = 9·8 for March–August, 1911. The spring had 5·2 inches, so that we might look for a summer rainfall not over 4·6 inches. (The average is 6·7 inches.) The actual amount appears to have been 3·7 inches. The difference of the sums for 1904 and 1909 is −1·9 inches; and the previous distribution of dots, indeed, points to a greater diminution than 1 inch.

Alex. B. MacDowall.

Limits of Explosibility in Gaseous Mixtures.

In making experiments recently on the explosion of gases by means of an incandescent wire, I have obtained much wider limits of explosibility than those usually given. The following table shows the numbers obtained:—

	Limits with incandescent platinum wire Per cent.	Limits (Clowes) Per cent.
Marsh gas	2·5 to 24	5 to 13
Coal gas	4 to 28	6 to 29
Hydrogen	3 to 75	5 to 72

In each case the gas was mixed with air. The explosion was carried out in a glass tube of about 10 c.c. capacity having a stop-cock at each end, and a mercury gauge of small bore attached to the middle of the tube. When the explosion occurs the mercury moves more or less sharply, according to the force of the explosion, but a distinct movement, apart from that due merely to the expansion caused by the heating of the wire, can be seen with the proportions of gases given above. The marsh gas was prepared from zinc methyl, as aluminium carbide, on treating with water, was found to give 33 per cent. hydrogen.

I am not clear as to why the limits should be wider than those usually obtained; possibly it is due to catalytic action of the platinum wire, or possibly the apparatus is more sensitive than that usually employed. The matter seems of interest in connection with colliery explosions. Using the same apparatus, I have obtained explosions with coal-dust and air, and with lycopodium powder and air, no other gas being present.

E. P. Perman.

University College, Cardiff.

Working Hypotheses *v.* Collection of Bare Facts.

Perhaps it is desirable to explain that my review of Prof. Schuster's book published in Nature of September 21 was written and sent to you before Prof. H. H. Turner had delivered his address to the British Association as president of Section A. Consequently, nothing in my review is a reply to, or has any reference to, Prof. Turner's excellent address. It would be discourteous to criticise an important pronouncement of a leader in science in any back-handed way. My statement and his are probably not really in opposition, though they to some extent emphasise opposite types of investigating activity.

Oliver Lodge.

Use of Wind-furnaces in Smelting.

It may interest your correspondent, Mr. George Turner (p. 381), to be reminded that wind-furnaces (furnaces without any blast but that of the wind) were used, at all events for lead smelting, much less than 900 years ago. Until some time in the seventeenth century the Derbyshire lead-smelters did not employ an artificial blast. They, like their predecessors in Roman times, built their furnaces on the tops of hills and facing the quarter of the prevalent winds. Dr. Percy in his "Metallurgy of Lead" gives extracts from Bishop Watson's "Chemical Essays" and from an earlier writer, Joshua Childrey, describing such wind-furnaces.

H. T. Wood.

Royal Society of Arts, W.C., September 24.

Meteor-showers.

Besides the ordinary display of Orionids that occurs near the middle of October, a considerable amount of meteoric activity may be looked for about the beginning of the month. Indeed, the intensity of the earlier meteor-showers promises to be considerably greater than that of any of the subsequent ones in October. The following are computed particulars of two important meteor-showers that become due before October 6.

Epoch September 29, 3h. (G.M.T.), second order of magnitude. Principal maximum September 30, 18h. 25m. Secondary maxima September 29, 16h., and October 2, 16h. 25m.

Epoch October 5, 6h. 30m., third order of magnitude. Principal maximum October 3, 22h. 10m. Secondary maxima October 2, 2h. 45m., and October 4, 11h.

After these there will be meteoric quiescence until October 12.

John R. Henry.

2 Belgrave Villas, Rathmines, Dublin, September 26.

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